



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/098,714

03/15/2002

Kevin D. MacLean

NMTC-0770

3043

30185

7590

06/05/2006

NUMERICAL TECHNOLOGIES  
c/o A. RICHARD PARK, REG. NO. 41241  
PARK, VAUGHAN & FLEMING LLP  
2820 FIFTH STREET  
DAVIS, CA 95616-2914

EXAMINER

ALHIJA, SAIF A

ART UNIT

PAPER NUMBER

2128

DATE MAILED: 06/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/098,714

Applicant(s)

MACLEAN ET AL.

Examiner

Saif A. Alhija

Art Unit

2128

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 February 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. Claims 1-35 have been presented for examination.

**Response to Amendment**

2. i) The Examiner thanks the Applicant for clarification of the claims.  
ii) The Examiner withdraws the 112 2<sup>nd</sup> rejections following Applicants Amendment.

**Claim Interpretation**

3. Claims 1, 11, 21, 31, and 32 contain the statement "...so that a simulated layout of a solution for the target cell matches a desired layout for the target cell." This statement carries no patentable weight, as it is an intended use of the method.

**Claim Rejections - 35 USC § 102**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-35 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Cobb "Streamlined IC Mask Layout Optical and Process Correction Through Correction Reuse", WO 00/67074 A1, hereafter referred to as Cobb.

Regarding Claim 1:

**Cobb discloses** A method for speeding up an iterative process that simulates and corrects a layout of a target cell within an integrated circuit so that a simulated layout of a solution for the target cell matches a desired layout for the target cell, the method comprising:

determining if the target cell is similar to a preceding cell for which there exists a previously calculated solution; (**Page 6, Paragraph 1 and 2. Page 8, Paragraph 1 and 2. Figure 1 and 5**)

if the target cell is similar to the preceding cell, using the previously calculated solution for the preceding cell as an initial input to the iterative process for the target cell; (**Page 6, Paragraph 1 and 2. Page 8, Paragraph 1 and 2. Figure 1 and 5**)

otherwise using the layout of the target cell as the initial input to the iterative process for the target cell; and

performing the iterative process on the target cell to produce the solution for the target cell. (**Page 6, Paragraph 1 and 2. Page 8, Paragraph 1 and 2. Figure 1 and 5**)

**Regarding Claim 2:**

**Cobb discloses** The method of claim 1, wherein the target cell is similar to the preceding cell if the layout of the target cell matches the layout of the preceding cell, but the environment surrounding the target cell differs from the environment surrounding the preceding cell. (**Page 6, Paragraph 1 and 2. Page 8, Paragraph 1 and 2. Figure 1 and 5**)

**Regarding Claim 3:**

**Cobb discloses** The method of claim 2, wherein if the previously calculated solution for the preceding cell is used as the initial input to the iterative process, the iterative process only operates on features within a border region within the target cell that can be affected by the environment surrounding the target cell, and ignores features within the target cell that are not located within the border region.

**(Page 6, Paragraph 1 and 2. Page 8, Paragraph 1 and 2. Figure 1 and 5)**

**Regarding Claim 4:**

**Cobb discloses** The method of claim 1, wherein the target cell is similar to the preceding cell if the layout of the target cell matches the layout of the preceding cell, and the environment surrounding the target cell matches the environment surrounding the preceding cell. **(Page 6, Paragraph 1 and 2. Page 8, Paragraph 1 and 2. Figure 1 and 5)**

**Regarding Claim 5:**

**Cobb discloses** The method of claim 1, wherein the simulated layout corresponds to a manufactured result for the layout. **(Page 6, Paragraph 1 and 2. Page 8, Paragraph 1 and 2. Figure 1 and 5)**

**Regarding Claim 6:**

**Cobb discloses** The method of claim 1, wherein the target cell is similar to the preceding cell if the layout of the target cell differs from the layout of the preceding cell by less than a pre-specified amount. **(Page 5, Top Paragraph, Lines 1-4 . Figure 5)**

**Regarding Claim 7:**

**Cobb discloses** The method of claim 1, wherein if the previously calculated solution for the preceding cell is used as the initial input for the iterative process, and if the iterative process produces a simulation result that differs significantly from the desired layout, the method further comprises restarting the iterative process using the desired layout instead of the previously calculated solution as the initial input to the iterative process. **(Page 5, Top Paragraph. Figure 1 and 5)**

**Regarding Claim 8:**

**Cobb discloses** The method of claim 1, wherein the iterative process involves repeatedly:

simulating a current solution for the target cell to produce a current simulated layout; (**Page 5,**

**Top Paragraph. Figure 1 and 5)**

if the current simulated layout differs from the desired layout by less than a pre-specified amount, accepting the current solution as a final solution for the target cell; (**Page 5, Top Paragraph. Figure 1 and 5)**

and otherwise, correcting the current solution to compensate for differences between the current simulated layout and the desired layout. (**Page 5, Top Paragraph. Figure 1 and 5)**

**Regarding Claim 9:**

**Cobb discloses** The method of claim 1, wherein prior to considering the target cell, the method further comprises:

receiving a specification for the layout of the integrated circuit; (**Page 4, Last Paragraph. Figure 1 and 5)**

and dividing the layout into a plurality of cells, whereby each cell can be independently subjected to the iterative process. (**Page 4, Last Paragraph. Figure 1 and 5)**

**Regarding Claim 10:**

**Cobb discloses** The method of claim 1, wherein the iterative process performs model-based optical proximity correction (OPC). (**Abstract)**

**Regarding Claims 11-20 and 21-30:**

See rejection for Claims 1-10.

Regarding Claims 31 - 33:

See rejection for Claim 1.

Regarding Claim 34:

See rejection for Claim 2.

Regarding Claim 35:

See rejection for Claim 6.

**Response to Arguments**

6. Applicant's arguments filed 8 February 2006 have been fully considered but they are not persuasive.

i) Applicant argues that Cobb teaches away from the present invention by reusing the previously determined corrections and not using the previously calculated solution as a starting point for the correction process. First, the Examiner respectfully points out that according to MPEP 2141.02 Section VI., Prior Art must be considered in its entirety including disclosures that teach away from the claims. Second, as per the last paragraph of page 8 and the first paragraph of page 9, the correction process utilizes an iterative process to determine needed corrections in addition to further storing differing corrections for further use.

**Conclusion**

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 2128

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. All Claims are rejected.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Saif A. Alhija whose telephone number is (571) 272-8635. The examiner can normally be reached on M-F, 11:00-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571) 272-2279. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAA

May 4, 2006



Application/Control Number: 10/098,714

Page 8

Art Unit: 2128

HUGH JONES Ph.D.  
PRIMARY PATENT EXAMINER  
TECHNOLOGY CENTER 2100